Managing your spray in blueberries

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A new industry standard for water volumes when spraying in blueberries has been developed.

Effective and efficient spray application is important for blueberry production. Spray liquid (concentration) and sprayer air outputs (coverage) need to be matched to different bush targets to deliver an effective chemical dose with sufficient target coverage. Timely and economic spraying is a trade-off between travel speeds and spray volumes to maximise spraying work rates without compromising target penetration and coverage. **There are three basic rules to sprayer setup and spray optimisation:**

1. Direct the spray output towards the target canopy

The main problem with spraying is failing to hit the target. To assess your spray output, park the sprayer in a block to be treated. Look at which nozzles should be turned on and what proportion of the output is directed to the different bush zones (Figure 1). Adjust nozzles as required for better coverage and use water sensitive paper (Figure 3) to help you assess the coverage.

Figure 1. Croplands Quantum mister sprayer in blueberries. Note the angle of the setup to allow optimum coverage. Photo Credit: Melinda Simpson

2. Adjust your spray water volume to match different canopies

Dilute spray volume is required to calculate the correct amount of chemical to be applied to cover the canopy. Mixing the right concentration is just as important as determining the water volume required. **An industry standard for water volumes in blueberries is presented in Figure 2.** Chemical application rate is dependent on spray water volume (when using the per 100 L water rate) and spray water volume is dependent on crop canopy volume.

For example, the total amount of Indoxacarb per hectare will vary when applied to different canopy volumes (Table 1). If spray water volumes are not matched to crop canopy volumes (i.e. less water than industry standard), chemical application rates should be adjusted (i.e. using a concentration factor) to achieve the same dose. Using these water volumes and the per 100 L label rate will achieve the most desirable amount of chemical per leaf area. Water sensitive paper should be used to verify these volumes and coverage.

Table 1. The amount of Indoxacarb per ha (17 g/100 L) varies when applied to different canopy volumes.

Canopy Size	Water volume (L/ha)	Product (g)
Small	450	76.5
Medium	650	110.5
Large	850	114.5

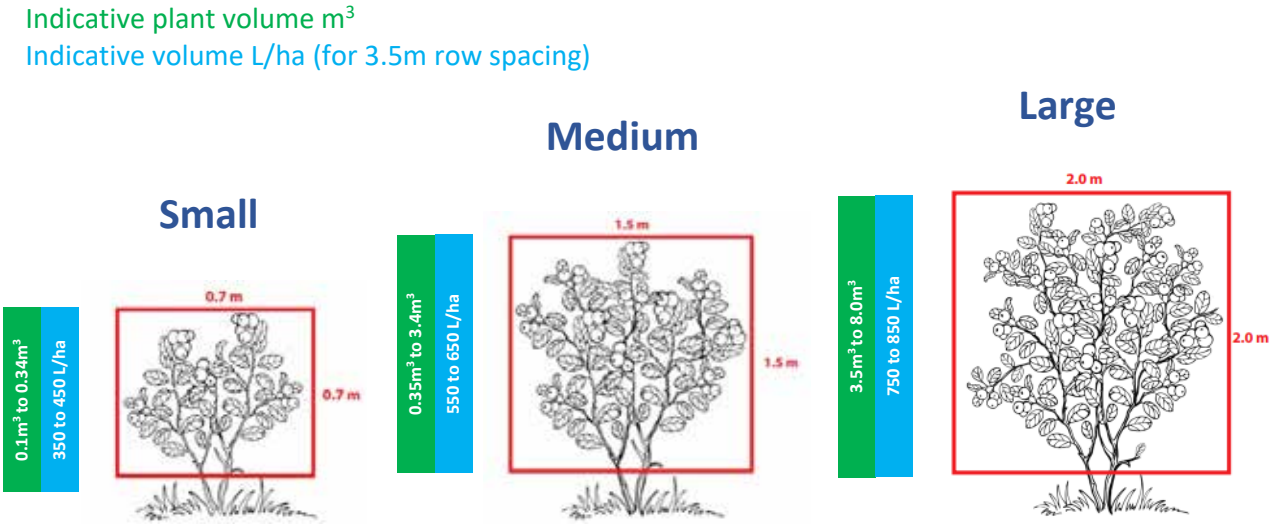

Figure 2. Different canopy volumes will require different water volumes.
Photo Credit: Melinda Simpson

3. Penetrate the target by matching air output volumes to travel speed, canopy density and wind conditions

Effective penetration is achieved by proper air movement at the correct fan and travel speeds. Poor coverage and excessive drift can occur when fan speeds are too high, blasting the droplets through the canopy. Poor coverage can also occur when the operator is driving too fast, causing improper air displacement. This prevents droplets from reaching the inner areas of the canopy.

Using water sensitive paper

Water sensitive paper (Figure 3) is an effective and economical way to monitor spray distribution. To test your coverage, place six pieces of water sensitive paper per plant, locating them on the top, middle and bottom and on the underside and top of the leaf surface, for multiple plants along a row. Generally, 85 fine–medium-sized droplets per square centimetre, with about 15% total surface coverage, should be adequate for most foliar applications. Be prepared to make changes to your sprayer calibration to compensate for plant height, canopy density and weather conditions throughout the season. Using water sensitive paper takes some time and effort but is far more accurate than 'shoulder-checks' and lead residue.

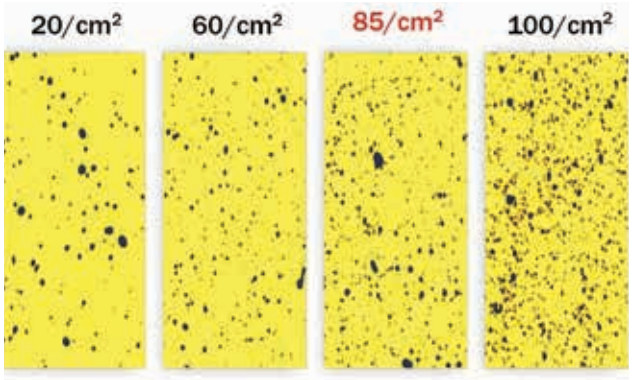

Figure 3. 85 droplets per square centimetre provides best coverage.
Photo Credit: Sprayers 101

Nozzles and droplet sizes

There is a trade-off between droplet size, spray drift and chemical coverage. The smaller the droplet, the greater the risk of spray drift but the better the coverage will be. Larger droplets will reduce spray drift but coverage will not be as effective (however, a good, low drift wetting agent can overcome this).

Rules of thumb with nozzles:

- Hollow cone nozzles produce smaller droplets and less size range than solid cone nozzles
- Wide angle nozzles produce smaller droplets than narrow angle nozzles
- Lower output nozzles produce smaller droplets than higher output nozzles

Larger droplets are preferable when spraying near sensitive areas (always follow the label recommendations). Combining large droplet size and a wetting agent will significantly reduce the risk of off-target drift. Some product labels state the size of the nozzle required and/or nominated buffer zones; both must be followed.

Calibration is an efficiency tool often overlooked and under-used by many growers. Over time, all nozzles suffer from wear and tear, causing their orifices to get bigger, increasing the desired or calibrated output. Uneven wear can cause poor spray patterns and poor control; both potentially causing crop damage. Regular sprayer calibration throughout the season based on bush growth will give greater spraying accuracy.

For best results, calibrate your spray unit at the end of the growth phase (February – May depending on variety). Regularly cleaning nozzles improves delivery rates by removing debris build-up (Figure 4).

Acknowledgements

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Figure 4. Dirty Nozzles